

## REMARKS

The comments of the Examiner as set forth in the official office action of January 26, 2005 have been carefully studied and reviewed. The informalities found by the Examiner in the specification and discussed in the office action have been addressed. In addition, the concerns with respect to Section 112 are well taken and the claims have been amended to address the Examiner's concerns.

Claims 1-11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Stevens, U.S. Patent No. 4,416,748. For the reasons set forth below, it is urged that the Patent Office has not made out a prima facie case of obviousness.

The Patent Office acknowledges that Stevens does not teach certain limitations found in claim 1 and the claims depending directly or indirectly therefrom. In this regard, at page 9 of the office action, the Patent Office states:

Stevens does not teach maintaining a NO<sub>x</sub> concentration in the gas stream at a concentration level sufficient to maintain in the gas stream an active set of free radical chain reactions.

But then the Patent Office maintains as follows:

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Stevens by maintaining a NO<sub>x</sub> concentration in the gas stream at a concentration level sufficient to maintain in the gas stream an active set of free radical chain reactions because Stevens teaches that sensors are located in the duct and in the stack, the former sensors being responsive to the concentrations of SO<sub>2</sub> and/or NO<sub>x</sub> and serving to increase the rate of addition of NH<sub>3</sub> as the concentrations of SO<sub>2</sub> and/or NO<sub>x</sub> increase (col. 5, line 60 to col. 6, line 2). Thus, this teaching would have suggested to one having ordinary skill in the art that the NO<sub>x</sub> concentration in the gas stream was maintained at a concentration level. This concentration level would have been sufficient to maintain in the gas stream an active set of free radical chain reactions because the process is

continuous (= the process is applied to a flowing stream of the gas) [col. 1, lines 39-40].

It is well settled that a prima facie case of obviousness cannot be made if the reference or references being utilized teach away from the claimed invention. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). This case presents a classical teaching away from the claimed invention. Throughout the Stevens disclosure the emphasis is on removing the NO<sub>x</sub> from the gas stream, rather than maintaining NO<sub>x</sub> within the gas stream. Further, Applicants' claimed invention is directed at removing ammonia from the gas stream. In Stevens, as noted above, the invention is focused on removing NO<sub>x</sub> from the gas stream and, ironically, injects ammonia into the gas stream in order to remove the NO<sub>x</sub>. Hence, on the one hand Applicants' invention is directed at removing ammonia while Stevens teaches injecting ammonia, and furthermore, in order to remove ammonia from the gas stream Applicants' invention focuses on maintaining NO<sub>x</sub> in the gas stream to assist in the removal of ammonia while Stevens teaches injecting ammonia into the gas stream in order to remove the NO<sub>x</sub>.

The title of the Stevens inventions states a "Process for Reduction of the Content of SO<sub>2</sub> and/or NO<sub>x</sub> in Flue Gas." The opening paragraph of the specification states:

The present invention relates to a process for the reduction of the content of SO<sub>2</sub> and/or nitrogen oxides NO and NO<sub>2</sub> (sometimes referred to by the general term "NO<sub>x</sub>") in flue gases.

(Stevens, col. 1, ll. 5-9)

Thereafter Stevens discloses three reactions, numbered 1-3, that explains how his process removes the NO<sub>x</sub> from the flue gases. In particular, Stevens teaches removing NO<sub>x</sub> from the flue gases by mixing the gas with NH<sub>3</sub> and irradiating the mixture with ultraviolet light. By this process the NH<sub>3</sub> is photolyzed in the spectral range of 190 to 220 nanometers to yield amino radical, NH<sub>2</sub>, in accordance with the reaction:



As taught by Stevens, the amino radical reacts with  $\text{NO}_x$  to yield nitrogen and  $\text{N}_2\text{O}$  according to the following reactions:



(Stevens, col. 1, ll. 13-24)

Thus, the singular goal of Stevens is to remove  $\text{NO}_x$  and/or  $\text{SO}_2$  from the flue gases - not to maintain the  $\text{NO}_x$  in the gas stream. Repeatedly throughout the Stevens specification the emphasis is on removing the  $\text{NO}_x$  and doing so by injecting ammonia into the gas stream.

A person of ordinary skill in the art upon reviewing Stevens would come away with the indelible impression that Stevens' goal was to remove as much  $\text{NO}_x$  as practically possible. The idea of modifying Stevens to maintain a certain concentration of  $\text{NO}_x$  is fundamentally contrary to the most basic teachings of Stevens. Indeed, as already discussed, Stevens in the most direct way teaches away from Applicants' claimed invention.

Stevens teaches a process that is dependent on the absorption of ultraviolet light of 190 to 220 nanometers by ammonia in order to initiate the direct photolysis of the ammonia molecule indicated in reaction 1. The Applicants' claimed invention does not involve the direct photolysis of ammonia and does not involve ultraviolet light in the spectral range of 190 to 220 nanometers. Stevens clearly teaches that ultraviolet light in the spectral range from 220 to 300 is used only to accomplish the direct photolysis of hydrazine (Stevens page 4, lines 19-35), a toxic compound formed due to the irradiation of high concentrations of ammonia in the spectral range of 190 to 220 nanometers. The Applicant's process is not obvious based on Stevens because the Applicant's claimed

invention (1) does not involve the irradiation of ammonia in the spectral range of 190 to 220 nanometers and (2) does not result in the formation of high concentrations of hydrazine.

For the reasons set forth above, there should be no need to address claims dependent, directly or indirectly, from claim 1. However, briefly, Applicants will note that it is still the burden of the Patent Office to make out a prima facie case of obviousness for each and every claim rejected. A prima facie case of obviousness requires a motivation or suggestion to make the proffered modification. Conclusionary statements can never suffice to satisfy the burden. For example, claim 2 calls for the NO<sub>2</sub>/NO concentration ratio to be maintained generally at a value less than 10. Stevens does not even address this ratio. The Examiner simply concludes that Stevens teaches a similar overall process and similar processes can reasonably be expected to yield similar results, unless proven otherwise. Respectfully, there is no basis in Section 103 jurisprudence for the proposition of law being offered. In obviousness cases the burden is on the Patent Office not the Applicant. This burden can never be satisfied by maintaining that because the prior art is similar that certain claimed limitations would be obvious even though the claimed limitations are not found in the prior art. In the case of claim 2, for example, the critical limitation is that the NO<sub>2</sub>/NO concentration ratio is maintained generally at a value of less than 10. Stevens does not teach maintaining the ratio of NO<sub>2</sub>/NO to a value of less than 10. To make out a prima facie case of obviousness it is incumbent upon the Patent Office to set forth a motivation why a person of ordinary skill in the art would modify Stevens to maintain this claimed ratio. The Patent Office has not done that for claim 2, nor for many of the other dependent claims.

The Examiner has questioned some of the language in various claims. With respect to claim 9 the Examiner is correct in that one of the stages of the two-stage irradiation process is further limiting the irradiating step of claim 1. With respect to claim 14 the "irradiation" recited therein is the same as referred to in claim 12. With respect to claim 16, one of the stages of the two-stage irradiation process is the same as referred to in claim 12.

For the foregoing reasons, it is respectfully urged that the present application is in condition for allowance and allowance is respectfully requested.

Respectfully submitted,

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